This invention relates to small flexible containers, and, in particular, to an improved collapsible end disposable milk container for use as an infant's nursing bottle which is readily filled and sealed prior to use.

A known type of infant's nursing bottle includes a relatively rigid outer shell and a removable sterilized collapsible liner in the form of a thin-walled plastic bag having a nipple extending from one end thereof and a hole for filling located near the other end. In use, the bag is inserted into the shell with the nipple projecting through a hole in the shell and is then filled with the desired liquid through the filling hole which is thereafter sealed against leakage. The plastic bag collapses as the liquid is withdrawn through the nipple thus avoiding the necessity for venting air into the bag during nursing.

After use, the bag is removed from the shell and disposed of, the said shell being retained for use with a fresh bag. This type of nursing bottle is advantageous in several respects, particularly in that the sterile sterilization procedure is avoided. However, some difficulties are encountered in filling the bag due to its flexible nature, in effectively maintaining the sterile condition inside the bag prior to and during filling, and in sealing the bag after filling.

In the present invention, an improved construction for the bag permits its interior to be maintained sterile during storage and during filling, and permits the bag to be easily filled and sealed with a minimum of effort. Broadly, this is accomplished by providing the filling end of the bag with a relatively rigid flexible filling tube which communicates with the tapered end of a relatively rigid funnel. The mouth of the funnel is sealed with a membrane for maintaining the funnel, tube and bag sterile and which may be ruptured or removed just prior to the filling operation. When full, the bag is sealed by closing the tube near its juncture with the bag. The funnel and the portion of the tube between the funnel and the closure may then be cut or torn off and discarded. After use, the bag may also be discarded.

It is therefore an important object of the present invention to provide an improved construction for a flexible, collapsible container which permits the container to be easily filled while effectively preventing contamination of the interior.

It is a further object of the present invention to provide an improved construction for a flexible, collapsible container which may be easily and effectively sealed after filling.

Another object is to provide an improved infant's nursing bottle of the type having an outer rigid shell and an inner collapsible, disposable bag, said bag being positively maintained sterile prior to and during filling, and in which the bag is easily and positively sealed after filling.

It is still another object of the present invention to provide a collapsible disposable bag for an infant's nursing bottle which has a filling tube extending therefrom and communicating with a filling funnel which is maintained sealed until filling is commenced.

The invention will be more fully understood by referring to the following detailed description taken in conjunction with the drawings in which:

FIGURE 1 is an elevational view, half in section, of a flexible milk container embodying the principles of the present invention with a filling tube and funnel attached;
12 is complementary to the exterior contour of the first conical portion 30 of the container 10. As seen in FIGURE 3 the container may be inserted into the holder 12 through the bottom thereof and the flange 38 forced through the opening 46 so as to lock the container onto the holder. If desired, the holder 12 may be provided with one or more apertures 45 to permit the milk container and its calibration marks 43 to be seen.

FIGURE 5 illustrates a clip 48 which may be used, as shown in FIGURE 5, to seal the filling tube 16 after the container has been filled. The clip 48 includes two pairs of stiff legs extending in a common plane from a base 50. One pair of legs consists of two short legs 52 and 52' extending from the ends of the base 50 at right angles therewith. The second pair of legs consists of a long U-shaped member 54 and a slightly shorter straight member 56 between the legs of the U-shaped member. The legs and base are conveniently formed integrally from plastic or thin metal sheet. In use, the clip 48 is manipulated similarly to a conventional paper clip except that it is fastened to the filling tube in two stages. First, with the clip planar and with a right angle to the filling tube, the ends of members 54 and 56 are placed on opposite sides of the tube and the clip is pushed approximately half way to its end so that the end legs 52 are not yet in contact with the tube. Then the clip is rotated 180° about its longitudinal axis creating an 80° fold in the tube and is pushed further over the tube with one of the legs 52, 52' on either side thereof. FIGURE 3 shows the clip of FIGURE 5 which has been inserted half way over the filling tube 16 with member 54 in front of and member 56 behind the tube, rotated 180° toward the top of the drawing and then pushed further over the tube. During rotation of the clip two folds 58 and 60 are formed in the tube by members 54 and 52', respectively.

FIGURE 6 illustrates a rack 62 which may be provided to facilitate filling of one or more milk containers 16. As shown, the rack may conveniently include a base 64 having an upwardly projecting axial stem 66 rigidly attached thereto and a disk 68 axially attached, preferably rotatably, to the upper end of the stem 66. The disk 68 is provided with a plurality of radial cut-away portions 79 of sufficient size to allow the funnels 22 of a plurality of milk containers 16 to be inserted therethrough but small enough to prevent the flanges 24 on the funnels from passing therethrough. A plurality of milk container holders 10 may thereby be hung from the rack, nipple end down, by engagement of the flange 24 with the top surface of the disk 68. A knob 72 may conveniently be attached axially to the upper surface of the disk 68 to facilitate rotation thereof by grasping with the fingers.

FIGURES 7-11 illustrate a modified form of the milk container and holder of FIGURES 1-6 in which like parts are indicated by the same numeral with the addition of a prime. The milk container 10' includes a flexible, thin-walled body portion 14' having a nipple portion 28' near one end thereof and communicating with a filling tube 16' with attached funnel 22' near the other end. The filling tube 16' may be of sufficient length so that a knot 73 may be tied therein to seal the container after filling. Alternatively, the clip 48 may be used to seal tube 16'. The nipple portion 28' includes a nipple 36' and a relatively rigid base 74 extending slightly above the body portion and having a radial groove 76 in the periphery thereof. A flexible cover 40' is provided over the nipple 36' and is sealed to the base 74 in an annular manner. The open end of the funnel 22' is provided with a rupturable membrane 26' and an annular flange 24' for cooperation with the rack 62 of FIGURE 6. Additionally, the flange 24' is provided with a handle 78 projecting outwardly therefrom, as shown in FIGURE 9, so that the container 10' may be held in a filling position by the fingers, if desired.

The modified holder 12', as shown in FIGURE 10, consists of a generally scoop-shaped member having suitable legs, as at 80, for maintaining it in an upright position on a flat surface. The interior contour of the holder 12' is preferably complementary to the exterior of the milk container 10' so that the nipple 36' extends through the aperture in the holder, and is provided with an aperture near one end thereof having a radially projecting peripheral lip 82 which is adapted to mate with the groove 76 in the nipple base 74. As seen in FIGURES 10 and 11, the container 10' after being filled, sealed and placed in the holder 12', so that the nipple 36' extends through the aperture in the holder, and is provided with an aperture near the lip 82 with the groove 76. The filling tube 16' trails over the upper edge of the holder 12', resting at its juncture with the body 14' in a notch 84 which may be formed in the holder 12', if desired.

In use, the milk container 10' of FIGURES 1-6 will be received by the user from its place of manufacture with its interior sterilized and sealed from the atmosphere by the covers 40 and 26. The container may be empty if for use with formula or milk to be prepared by the user or it may contain dry formula of various kinds. When it is desired to use it, the liquid is poured into the container 10' by means of the flange 24 projecting from the funnel 22. Just prior to filling, the membrane 26 is ruptured or removed to expose the open end of the funnel. The cover 28 over the nipple 36 will normally be left in place during filling to maintain the nipple 36' and prevent leakage of the liquid from the container 10'. Liquid may then readily be poured into the funnel 22 from which it will flow through the filling tube 16 into the body 14. After the desired amount of liquid has been added, as indicated by the calibration marks 43, the filling tube 16 is sealed with the clip 48 intermediate the funnel and body as described above, and the remainder of the filling tube and the funnel are cut or torn off and discarded. The filled and sealed container 10 may then be inserted in the holder 12 or may be stored for future use, leaving the cover 40 in place over the nipple.

When the filled container is to be used, it is inserted, nipple-end first, into the bottom of the holder 12. When the nipple projects through the opening 46 in the conical end of the container, it is grasped with the fingers and pulled so as to cause the flange 32 to pass through the opening 46 thereby locking the container in the holder. The cover 40 may then be removed by pulling the rip tab 42. When empty, the container may be forced back out of the holder and discarded. The holder will be retained for reuse with another filled container.

The modified milk container 10' illustrated in FIGURES 7-11 may be held in the filling position with the aid of the rack 62 or it may be held with the fingers by means of the handle 78 of the funnel 22'. In either case, the membrane 26' will be left intact until just prior to filling. After filling, the tube 16 may be sealed with the clip 48 or, since its length is greater than that of tube 16, it may be sealed by the tying of a simple knot 73 therein. The excess tube and the funnel 22' will then be removed and discarded. The filled and sealed container 10 may then be inserted into its holder 12' by the method described above with respect to container 10 and holder 12 whereby the lip 82 on the holder 12 engages the groove 76 in the nipple base 74. The cover 40' may then be removed from the nipple 36'. After use, the empty container 10' may be discarded.

While two preferred embodiments have been described and illustrated, the present invention is not intended to be limited to the specific details disclosed, except insofar as such limitations are included in the claims.

What is claimed:

1. A disposable bag for a nursing bottle of the type which includes an outer relatively rigid supporting shell and an inner flexible disposable bag for containing a liquid which comprises: a flexible collapsible body portion having a nipple portion projecting outwardly from a wall thereof; a flexible tubular portion of reduced cross-
section communicating at one end thereof with said body portion and communicating at the other end thereof with one end of a passage in a relatively rigid member, the other end of said passage being of greater transverse cross-section than said tubular portion.

2. A disposable bag as in claim 1 further comprising removable sealing membranes over said nipple and over said other end of said passage whereby the inner surfaces of said body, tubular portion and said rigid member are protected from contamination.

3. A disposable bag as in claim 1 in combination with compression means for closing said tubular portion intermediate said body portion and said passage.

4. A combination as in claim 3 in which said compression means includes a clip which comprises a base member and two pairs of legs extending therefrom in a common plane, one of said pairs of legs including two short members extending from the ends of the base member and the other pair of legs including a U-shaped member and a straight member between the legs of the U-shaped member.

5. A disposable bag as in claim 1 wherein said tubular portion has a length which permits said portion to be tied in a knot to thereby effect closure of said tubular portion.

6. A disposable bag as in claim 1 in which said relatively rigid member and said passage are funnel-shaped and in which said tubular portion communicates with the tapered end of said passage.

7. A disposable bag as in claim 1 in which said relatively rigid member has a laterally projecting portion for engaging with a support member.

8. A disposable bag as in claim 7 in combination with rack means for engaging said projecting portion on said relatively rigid member whereby said flexible tubular portion will hang in a vertical position above said body portion and below said passage.

9. An integral disposable plastic bag for a nursing bottle of the type which includes an outer relatively rigid supporting shell and an inner flexible disposable bag for containing a liquid which comprises: a flexible collapsible body portion, a nipple portion projecting from said body portion; a flexible tubular portion of reduced cross-section communicating at one end thereof with said body portion; a funnel means defining a funnel-shaped passage, the smaller end of said passage communicating with the other end of said flexible tubular portion; means associated with said nipple portion for locking said portion to an outer relatively rigid supporting shell; and support means projecting laterally from said funnel means.

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